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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/563,333	12/30/2005	Syuuji Eguchi	056205.57275US	6778

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EXAMINER	
CHEN, XIAOLIANG	
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2841	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

T/H

Office Action Summary	Application No.	Applicant(s)	
	10/563,333	EGUCHI ET AL.	
	Examiner	Art Unit	
	Xiaoliang Chen	2841	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 December 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 December 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *8-25-06, 12-30-05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-2, 5 and 7-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schliebe et al. (US5957547) in view of Nishizawa et al. (US4119678) and Aida et al. (US5540581).

Re claim 1, Schliebe et al. clearly show and disclose

A module comprising a connector (15, fig. 2) having metal terminals for connection, and a circuit board (31, fig. 2) mounting electronic components (32, fig. 2), said connector and said board being connected to each other through metal leads (20, fig. 3), wherein: the surface of said connector on the side being connected to said board, said metal leads,

Schliebe et al. does not disclose 1) said electronic components being sealed with the same thermosetting resin, and said thermosetting resin being in solid state at temperatures of 40°C or below before curing, 2) the thickness of said thermosetting resin sealing said electronic components being changed depending on the heights of said electronic components.

In the same field of an electronic device, Nishizawa et al. teaches:

1) said electronic components are sealed with the same thermosetting resin (a thermosetting resin [Brief Summary (41)]), and said thermosetting resin is in solid state (a solid epoxy resin [Brief Summary (14)]) at temperatures of 40°C or below (at temperatures below 50°C [Brief Summary (14)]) before curing,

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the electronic device of Schliebe et al. by sealing with the thermosetting solid state resin as taught by Nishizawa et al., "The composition has a very good storage stability, excellent in the mechanical resistance, corrosion resistance, solvent resistance and luster." (Nishizawa et al., [ABSTRACT]).

In the same field of an electronic device, Aida et al. teaches:

2) the thickness of said thermosetting resin sealing said electronic components is changed depending on the heights of said electronic components (When injection-molding a molten thermoplastic resin into a molding having different thicknesses [ABSTRACT]).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the electronic device of Schliebe et al. by adapting the injection-molding as taught by Aida et al., "to provide a mold suitable for manufacturing a molded part with excellent surface appearance, free from sink marks, even when the part has wall sections that vary significantly in thickness." (Aida et al., [col.3, line 39])

Re claim 2, Schliebe et al. clearly show and disclose

The module according to Claim 1,

Schliebe et al. does not disclose said thermosetting resin being an epoxy resin that contains inorganic fillers and being in solid state at temperatures of 40°C or below.

In the same field of an electronic device, Nishizawa et al. teaches:

said thermosetting resin is an epoxy resin (a solid epoxy resin [Brief Summary (14)]) that contains inorganic fillers (the fillers include calcium carbonate, calcium sulfate, barium sulfate and the like. [Brief Summary (60)]) and is in solid state at temperatures of 40°C or below (at temperatures below 50°C [Brief Summary (14)]).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the electronic device of Schliebe et al. by sealing with the thermosetting solid state resin as taught by Nishizawa et al., "The composition has a very good storage stability, excellent in the mechanical resistance, corrosion resistance, solvent resistance and luster." (Nishizawa et al., [ABSTRACT]).

Re claim 5, Schliebe et al. clearly show and disclose

The module according to Claim 1, wherein: ends of said metal leads are inserted in through holes formed in said board and thereafter fixed by using a solder (fig. 3) or a conductive adhesive.

Re claim 7, Schliebe et al. clearly show and disclose

The module according to Claim 1, wherein: said circuit board is a printed board (31, fig. 2), and a metal base or a plastic composite (35, fig. 2) for heat radiation is disposed just under said printed board mounting a power semiconductor chip (power switching devices [col. 2, line 21]) that generates heat.

Re claim 8, Schliebe et al. clearly show and disclose

The module according to Claim 7, except for said metal base or said plastic composite for heat radiation has a smaller area than said printed board. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a thermally conductive composite having different size, since such a modification would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. In re Rose, 105 USPQ 237 (CCPA 1955).

Also, Fig. 3 shows the thermally conductive composite is smaller than the spreader, (not the PCB, but the same functionality and similar structure).

Re claim 9, Schliebe et al. clearly show and disclose

The module according to Claim 1, except for a metal or plastic-made jig for mounting said module in an automobile engine room or on an engine is disposed on a rear surface of said circuit board. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a piece of flange for mounting said module in an automobile engine room, since

using a flange for mounting was well known knowledge in the art and it involves only routine skill in the art.

Re claim 10, Schliebe et al. clearly show and disclose

The module according to Claim 1, wherein: only the electronic-component mounting surface of said circuit board is sealed with said thermosetting resin, and an opposite surface of said circuit board is fixed to or disposed on a metal or plastic casing (fig. 2) including said connector by sticking, adhesion or a mechanical manner.

Re claim 11, Schliebe et al. clearly show and disclose

The module according to Claim 1, wherein: a metal or plastic composite (35) is disposed on a surface opposite to said circuit board (fig. 2) with said electronic components and said thermosetting resin sealing said electronic components interposed therebetween (space of 21, as stated in claim 1, by injection-molding).

Re claim 12, Schliebe et al. clearly show and disclose

A module comprising a connector (15, fig. 2) having metal terminals for connection, and a circuit board (31, fig. 2) mounting electronic components (32, fig. 2), said connector and said board being connected to each other through metal leads (20, fig. 3), wherein: (A) the surface of said connector on the side being connected to said board (fig. 2), said connector is disposed perpendicularly to a surface of said board (fig. 2)

Schliebe et al. does not disclose 1) said metal leads, and said electronic components are sealed with the same thermosetting resin, said thermosetting resin is in solid state at temperatures of 40°C or below before curing, 2) the thickness of said thermosetting resin sealing said electronic components is changed depending on the heights of said electronic components, and said connector being covered with said thermosetting resin sealing said electronic components or disposed on a surface of said board on the side opposite to the surface covered with said thermosetting resin.

In the same field of an electronic device, Nishizawa et al. teaches:

1) said metal leads, and said electronic components are sealed with the same thermosetting resin (a thermosetting resin [Brief Summary (41)]), said thermosetting resin is in solid state (a solid epoxy resin [Brief Summary (14)]) at temperatures of 40°C or below (at temperatures below 50°C [Brief Summary (14)]) before curing,

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the electronic device of Schliebe et al. by sealing with the thermosetting solid resin as taught by Nishizawa et al., "The composition has a very good storage stability, excellent in the mechanical resistance, corrosion resistance, solvent resistance and luster." (Nishizawa et al., [ABSTRACT]).

In the same field of an electronic device, Aida et al. teaches:

2) the thickness of said thermosetting resin sealing said electronic components is changed depending on the heights of said electronic components (When injection-molding a molten thermoplastic resin into a molding having different thicknesses [ABSTRACT]), and said connector being covered with said thermosetting resin sealing said electronic components or disposed on a surface of said board on the side opposite to the surface covered with said thermosetting resin (When injection-molding a molten thermoplastic resin into a molding [ABSTRACT]).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the electronic device of Schliebe et al. by adapting the injection-molding as taught by Aida et al., "to provide a mold suitable for manufacturing a molded part with excellent surface appearance, free from sink marks, even when the part has wall sections that vary significantly in thickness." (Aida et al., [col.3, line 39])

3. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schliebe et al. in view of Nishizawa et al. and Aida et al. as applied to claim 1 above, and further in view of Yuhas et al. (US5464658), Selvaraj et al. (US20040044134), and Kouchi et al. (US20040247882).

Re claim 3, Schliebe et al. clearly show and disclose

The module according to Claim 1,

Schliebe et al. does not disclose said thermosetting resin has the following resin physical properties after curing, 1) linear expansion coefficient; 8 - 25

ppm/°C, 2) modulus of elasticity; 8 - 30 GPa, and 3) glass transition temperature; 80 - 200°C.

In the same field of an electronic device, Yuhas et al. teaches:

1) linear expansion coefficient; 8 - 25 ppm/°C (17.4 ppm/°C [col. 5, line 49]),

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the electronic device of Schliebe et al. by replacing the resin with the resin having same expansion coefficient as taught by Yuhas et al., "stable epoxy resin have a coefficient of thermal expansion which matches covered laminates which provide improved registration in multilayer printed circuit boards and provide balanced thermal expansion in both the warp and fill directions." (Yuhas et al., [ABSTRACT])

In the same field of an electronic device, Selvaraj et al. teaches:

2) modulus of elasticity; 8 - 30 GPa (flex modulus, GPa 9.71 [0054]) ,

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the electronic device of Schliebe et al. by replacing the resin with the resin having same modulus of elasticity as taught by Selvaraj et al., "for a process which unequivocally leads to linear, solid polymeric phosphate with no possibility of residual halogen-phosphorus linkages which result in corrosion of common resin processing equipment." (Selvaraj et al., paragraph [0002])

In the same field of an electronic device, Kouchi et al. teaches:

3) glass transition temperature; 80 - 200°C (a glass transition temperature of 170°C [0030]).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the electronic device of Schliebe et al. by replacing the resin with the resin having same glass transition temperature as taught by Kouchi et al., "for low cost production of large size fiber reinforced composite material." (Kouchi et al., paragraph [0003])

4. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schliebe et al. in view of Nishizawa et al. and Aida et al. as applied to claim 1 above, and further in view of Kouchi et al. (US20040247882).

Re claim 4, Schliebe et al. clearly show and disclose

The module according to Claim 1,

Schliebe et al. does not disclose wherein: the glass transition temperature of said circuit board is 150°C or higher.

In the same field of an electronic device, Kouchi et al. teaches:

the glass transition temperature of said circuit board is 150°C or higher (a glass transition temperature of 170°C [0030]).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the electronic device of Schliebe et al. by replacing the circuit board with same glass transition temperature as taught by Kouchi et al., "for low cost production of large size fiber reinforced composite material." (Kouchi et al., paragraph [0003])

5. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schliebe et al. in view of Nishizawa et al. and Aida et al. as applied to claim 1 above, and further in view of Belopolsky (20040062015).

Re claim 6, Schliebe et al. clearly show and disclose

The module according to Claim 1,

Schliebe et al. does not disclose said electronic components are electronic components including a ball grid array or a chip scale package, and a circuit board mounting said BGA or CSP has through holes having diameters of 0.1mm - 10 mm and allowing said thermosetting resin to flow via said through holes.

In the same field of an electronic device, Belopolsky teaches:

said electronic components are electronic components including a ball grid array (BGA's [0002]) or a chip scale package, and a circuit board mounting said BGA or CSP has through holes having diameters of 0.1mm - 10 mm (through hole diameters 1.1 mm [0023]) and allowing said thermosetting resin to flow via said through holes.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the electronic device of Schliebe et al. adapting the BGA and the same size of the through hole as taught by Belopolsky, "The present invention relates to surface mounted electrical components having improved retentive properties." (Belopolsky, paragraph [0001])

6. Claims 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schliebe et al. in view of Nishizawa et al., Belopolsky, Aida et al. and Ishida et al. (US5571854).

Re claim 13, Schliebe et al. clearly show and disclose

A method for fabricating a module in which a connector (15, fig. 2) having metal terminals for connection, a circuit board (31, fig. 2) mounting electronic components (31, fig. 2), and metal leads (20, fig. 3) connecting said connector and said board to each other (fig.3),

Schliebe et al. does not disclose 1) the mounting electronic components including a BGA or a CSP, 2) preparing thermosetting resin that is in solid state at temperatures of 40°C or below before curing; 3) said connector and said board are molded with a resin, sealing the surface of said connector on the side being connected to said board, said metal leads, and said electronic components with the same thermosetting resin by using one of said molding machines; and changing the thickness of said thermosetting resin sealing said electronic components depending on the heights of said electronic components in said sealing step. 4) the method comprising the steps of: preparing one of a low-pressure transfer molding machine and a compression molding machine with molding pressure of 5 - 70 kg/cm2 and molding temperature of 150 - 180°C, or an injection molding machine with molding pressure of 20 - I00 kg/cm2 and molding temperature of 150 - 180°C;

In the same field of an electronic device, Belopolsky teaches:

1) the mounting electronic components including a BGA (BGA's [0002]) or a CSP,

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the electronic device of Schliebe et al. adapting the BGA mounting as taught by Belopolsky, "The present invention relates to surface mounted electrical components having improved retentive properties." (Belopolsky, paragraph [0001])

In the same field of an electronic device, Nishizawa et al. teaches:

2) preparing thermosetting resin (a thermosetting resin [Brief Summary (41)]) that is in solid state (a solid epoxy resin [Brief Summary (14)]) at temperatures of 40°C or below (at temperatures below 50°C [Brief Summary (14)]) before curing;

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the electronic device of Schliebe et al. by sealing with the thermosetting solid state resin as taught by Nishizawa et al., "The composition has a very good storage stability, excellent in the mechanical resistance, corrosion resistance, solvent resistance and luster." (Nishizawa et al., [ABSTRACT]).

In the same field of an electronic device, Aida et al. teaches:

3) said connector and said board are molded with a resin (thermoplastic resin [ABSTRACT]), sealing the surface of said connector on the side being connected to said board, said metal leads, and said electronic components with

the same thermosetting resin (When injection-molding a molten thermoplastic resin into a molding [ABSTRACT]) by using one of said molding machines; and changing the thickness of said thermosetting resin sealing said electronic components depending on the heights of said electronic components (When injection-molding a molten thermoplastic resin into a molding having different thicknesses [ABSTRACT]) in said sealing step.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the electronic device of Schliebe et al. by adapting the molding method as taught by Aida et al., "to provide a mold suitable for manufacturing a molded part with excellent surface appearance, free from sink marks, even when the part has wall sections that vary significantly in thickness." (Aida et al., [col.3, line 39])

In the same field of an electronic device, Ishida et al. teaches:

4) the method comprising the steps of: preparing one of a low-pressure transfer molding machine (preheated to 105°C by a transfer molding machine [col. 5, line 40]) and a compression molding machine with molding pressure of 5 - 70 kg/cm2 and molding temperature of 150 - 180°C (molding material which had been filled in a 175°C mold after preheated [col. 5, line 39]), or an injection molding machine with molding pressure of 20 - I00 kg/cm2 and molding temperature of 150 - 180°C;

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the electronic device of Schliebe

et al. by adapting the same way of molding as taught by Ishida et al., "can satisfy both requirements for good mold filling qualities and inhibition of formation of flash during molding, so that use of this molding material allows marked reduction of time and labor for after-working of the molded products " (Ishida et al., [col. 5, line 57]).

Re claim 14, Schliebe et al. clearly show and disclose

The method for fabricating a module according to Claim 13, said circuit board is fixed to or disposed on a metal or plastic casing by sticking or adhesion to which said connector is tentatively fixed in advance (fig. 2),

Schliebe et al. does not disclose thereafter said electronic components and a connector portion are integrally molded with said thermosetting resin.

In the same field of an electronic device, Ishida et al. teaches:

thereafter said electronic components and a connector portion are integrally molded with said thermosetting resin (by a molding machine [col. 5, line 44]).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the electronic device of Schliebe et al. by adapting the same way of molding as taught by Ishida et al., "can satisfy both requirements for good mold filling qualities and inhibition of formation of flash during molding, so that use of this molding material allows marked reduction of time and labor for after-working of the molded products " (Ishida et al., [col. 5, line 57]).

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US-20020181211 US-20040030123 US-20030236347 US-20030159764

US-20030116269 US-20020111707 US-20020086104 US-20020113331

US-20020010288 US-20020126457 US-20050057902 US-20060077643

US-20040047570 US-20030053767 US-20030104729 US-5364914

US-4042486 US-3619342 US-4524161 US-3919348 US-3907724

US-6314253 US-6222006 US-4446257 US-3617429 US-3616163

US-4147737 US-5385957 US-5672305 US-6415104 US-4548678

US-6043333 US-5743751 US-5699235 US-6282092 US-6365243

US-3772392 US-2983630 US-2935488 US-3484398 US-3838087

US-3300332 US-3510445 US-3331891

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Xiaoliang Chen whose telephone number is 571-272-9079. The examiner can normally be reached on 7:00-5:00 (EST), Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego Gutierrez can be reached on 571-272-2245. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Xiaoliang Chen X. C.
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